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REMARKS

The claims have been amended in view of the Office action and in view of the remarks which follow, the claims and the application as a whole are believed to be in condition for allowance.

Claim Rejections-35 USC § 112

In section 4 of the Detailed Action, it was stated as follows:

"Claim 20 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the applicant regards as the invention."

"In claim 5, a term '... the sacrificial layer is composed of SiGe' lacks antecedent basis since Applicants did not mention a sacrificial layer in the independent method claim 14? Applicant should clarify this limitation in the drawings."

Claim 20 has amended to remove the language referring to the sacrificial layer so it is respectfully submitted that the ground of rejection under 35 USC § 112 is now moot.

Claim Rejections - 35 U.S.C. § 103(a)

In section 5 of the Detailed Action, claims 1 and 14 were rejected under 35 U.S.C. 103(a) as being unpatentable over the Krivokapic Publication No. US 2004/0197975 A1. The Office Action stated as follows:

"Regarding claim 1, Krivokapic discloses a method of forming a MOSFET device comprising:

"forming a semiconductor structure comprising a source region 310, a drain region 320 over a horizontal surface of a substrate 110 comprising an insulating material 120;

"forming a channel structure over the horizontal surface of the substrate 110 connecting between the drain region 310 and the source region 320, with the channel structure comprising a horizontal semiconductor channel fin above a vertical fin 1610 with the planar fin 1620, the vertical fin 1610 having a proximal edge and a distal edge, with the proximal edge in contact with the horizontal surface of the substrate 110 and with the planar fin 1620 in contact with the distal edge of the vertical fin 1610 [Figs. 7, 9-10 and 16-18];

"forming a gate dielectric layer 1612 over exposed surfaces of the channel structure 1600; and"

"forming a gate electrode 1801 straddling the channel gate dielectric 1612 and the channel structure 1600 [Figs. 1-18]."

"Krivokapic discloses all the features of the claimed invention as discussed above, but does not disclose the vertical fin has a T-shaped cross-section as claimed in the claim 1. However, in Figs. 7-9 and 16, Krivokapic depicts a T-shaped cross-section of a vertical fin 1610 similar as claimed in the invention. Therefore, claim 1 is obviously rendered over Krivokapic.

"Regarding claim 14, Krivokapic discloses a narrow fin FINFET comprising:

"a semiconductor structure comprising a source region 310, a drain region 320 over a horizontal surface of a substrate 110 comprising an insulating material 120;

"a channel structure over the horizontal surface of the substrate 110 connecting between the drain region 310 and the source region 320, with the channel structure comprising a

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horizontal semiconductor channel fin above a vertical fin 1610 with the planar fill 1620, the vertical fin 1610 having a proximal edge and a distal edge, with the proximal edge in contact with the horizontal surface of the substrate 110 and with the planar fin 1620 in contact with the distal edge of the vertical fin 1610 [Figs. 7, 9-10 and 16-18];

“a gate dielectric layer 1612 over exposed surfaces of the channel structure 1600; and

“a gate electrode 1801 straddling the channel gate dielectric 1612 and the channel structure 1600.”

“Krivokapic discloses all the features of the claimed invention as discussed above, but does not disclose the vertical fin has a T-shaped cross-section as claimed in the claim 14. However, in Figs. 7-9 and 16, Krivokapic depicts a T-shaped cross-section of a vertical fin 1610 similar as claimed in the invention. Therefore, claim 14 is obviously rendered over Krivokapic.”

It is respectfully submitted that original claims 1 and 14 stated “a horizontal semiconductor channel fin above a vertical fin...” which distinguishes from the prior art. However to define the invention more clearly, the amended claims have been amended to describe the “planar fin” more explicitly by stating that the “horizontal semiconductor channel fin” is a “horizontally oriented, planar fin composed of a semiconductor material” and “with the vertical fin being composed of a material selected from the group consisting of a semiconductor material and an insulating material....” As amended it is clear that the “channel structure” comprises “a horizontally oriented, planar fin composed of a semiconductor material, with the planar fin being formed above a vertical fin, and with the planar fin and the vertical fin having a T-shaped cross-section...”

Allowable Subject Matter

In part 6 of the Office Action there was a statement of reasons for the indication of allowable subject matter which reads as follows:

“Claims 2-13 and 15-20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claim.”

“None of the prior art made of record does not disclose the channel structure comprises a vertical fin and a planar fin both composed of semiconductor material as cited in claims 2, 15 and 17-18 and the channel structure comprises a vertical fin composed of an insulating material and a planar fin composed of semiconductor material as cited in claims 3, 16 and 19 and a method including the steps as follows forming a sacrificial layer over the horizontal surface of the substrate prior to forming the channel structure; forming a patterned window extending through the sacrificial layer down to the horizontal surface of the substrate for shaping the vertical fin of the channel structure; depositing a semiconductor layer filling the patterned window to form the vertical fin of the channel structure and forming a blanket semiconductor layer covering the sacrificial layer; forming a channel mask over the blanket semiconductor layer aligned with the vertical fin of the channel structure; etching away portions of the blanket semiconductor layer aside from the channel mask to form the planar fill; whereby the channel

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structure comprises a vertical fin and a planar fin as cited in claims 4 and 9."

"Claims 5-8 and 10-13 are depend on claims 4 and 9, then, they also would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claim."


Claims 1 and 14 have been amended to include limitations from the original dependent claims, which are believed to be in accord with the substance of the above comments relative to allowability. It is believed to be clear from a reading of section 6 of the Office Action that both the amended method claims 1-13 and the amended device claims 14-20 include limitations that define allowable subject matter in that they recite a channel structure which comprises a vertical fin and a planar fin with the planar fin being composed of a semiconductor material and the vertical fin being composed of either an insulating material or a semiconductor material. Thus the amended claims are believed to define the invention in accordance with the statement defining what comprises allowable subject matter in the instant application.

Accordingly all of the pending claims and the application as a whole are believed to be allowable in view of the above indication of allowability thereof.

No fee is believed to be due for the submission of this amendment. If any fees are required, however, please charge such fees to Deposit Account No. 09-0458.

In view of the amendments and the above remarks favorable action including allowance of the claims and the application as a whole are respectfully solicited.

Respectfully submitted,


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